REMARKS

Claims 16-27 are pending in the present application. Claims 1-15 are canceled by the foregoing amendment as being directed to a nonelected invention. Applicants reserve the right to file a divisional application directed to the subject matter of nonelected claims 1-15.

In the Office Action mailed on October 7, 2005, the Examiner rejected claims 16-20 under 35 U.S.C. § 102(b) as being unpatentable as anticipated by the disclosure in Corle, *et al.*, U.S. Patent No. 5,121,256 (hereafter referred to as "the Corle, *et al.*, Patent"). Additionally, the Examiner rejected claims 21-27 as being unpatentable as obvious in view of the disclosure in the Corle, *et al.*, Patent.

In accordance with the foregoing amendment, independent claim 16 has amended to recite that the spacing between the lens element and the sample is not greater than approximately the wavelength of the exposure radiation divided by five and without an immersion lens between the lens element and the sample. Accordingly, the claim 16, as well as claims 17-27 which depend from claim 16, are clearly distinguishable over the disclosure in the Corle, *et al.*, Patent.

Considered in more detail, the Corle, *et al.*, Patent is described in paragraphs [0017]-[0018] on pages 6-7 of the present application. The Corle, *et al.*, Patent discloses the use of

solid immersion lithography. Specifically, a solid immersion lens is added to an existing optical system and placed closely adjacent to the sample. The optical system images the mask onto the wafer, and the immersion lens is shaped with a spherical surface and placed at a distance such that the beams enter the solid lens with no refraction.

In contrast, the method defined by pending claims 16-27, as amended, provides in accordance with one embodiment a technique described, for example, in conjunction with Figure 3a that was developed to address the issues encountered with immersion lithography. More particularly, a wafer 302 is placed on the stage 301. The projection lens 303 projects an image of the mask 304 on top of the wafer 302. The bottom surface of the lens is placed either in close proximity or in contact with the radiation sensitive layer (photoresist) on the wafer 302. Close proximity means that the distance between the bottom of the lens and the wafer is small compared to the wavelength of the exposure, typically smaller than the wavelength divided by 5. The setup described in Figure 3a will avoid the issue of having a liquid between the lens and the wafer. Moreover, in contrast to the disclosure in the Corle, *et al.*, Patent, there is no need to insert a solid "immersion" lens between the projection lens and the wafer as the image of the mask 304 is created in the vicinity of the bottom surface (surface facing the wafer) of the last lens

element of the projection lens 303. This setup allows the reduction of potential aberrations of the images created by the lens.

Importantly, for today's exposure systems the distance between the lens and the wafer is on the order of a few millimeters while the field size image is on the order of 20 to 40 millimeters, thus rendering the setup described in the Corle, *et al.*, Patent not viable. Indeed, to image such a field size, the solid immersion lens would be too thick compared to the distance between the projection lens and the wafer. Moreover, the setup proposed in the Corle, *et al.*, Patent is limited by aberrations when a large field is imaged. Building two separate lenses, one objective lens and one solid immersion lens also places extreme requirements on the alignment of the lenses, the vibration of the lenses, and the overall correction of the aberrations across the field.

Additionally, projection lenses used today for optical lithography are constructed of a large number of lens elements, typically on the order of 30 lens elements, as described in U.S. Patent No. 6,522,484 cited in the Information Disclosure Statement by the applicants. The large number of lens elements is required in order to lower the aberration level across the field of the image. The shape of each lens elements is optimized by taking into account all the other lens elements. Each element

is accurately positioned inside the lens assembly and kept in an environment where the pressure, temperature, and atmosphere are controlled. These tight requirements make the use of two separate lenses as described in the Corle, *et al.*, Patent impractical.

In view of the foregoing Amendment, it is submitted that claims 16-27, as amended, are in allowable form. Early action and allowance of the application are earnestly solicited.

Respectfully submitted,

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